

Fraction Busters and Equal Values Systems

Solve all problems on a separate piece of paper.

Example of Fraction Busters

Solve: $\frac{x}{2} + \frac{x}{5} = 6$

Multiplying by 10 (the common denominator) will eliminate the fractions.

$$10\left(\frac{x}{2} + \frac{x}{5}\right) = 10(6)$$

$$10\left(\frac{x}{2}\right) + 10\left(\frac{x}{5}\right) = 10(6)$$

$$5x + 2x = 60$$

$$7x = 60 \Rightarrow x = \frac{60}{7} \approx 8.57$$

Solve each equation.

1. $\frac{3}{4}x = 60$

2. $\frac{2}{5}x = 42$

3. $\frac{3}{5}y = 40$

4. $-\frac{8}{3}m = 6$

5. $\frac{3x+1}{2} = 5$

6. $\frac{x}{3} - \frac{x}{5} = 3$

7. $\frac{y+7}{3} = \frac{y}{5}$

8. $\frac{m}{3} - \frac{2m}{5} = \frac{1}{5}$

9. $-\frac{3}{5}x = \frac{2}{3}$

10. $\frac{x}{2} + \frac{x-3}{5} = 3$

11. $\frac{1}{3}x + \frac{1}{4}x = 4$

12. $\frac{2x}{5} + \frac{x-1}{3} = 4$

Example 1

Find the point of intersection for $y = 5x + 1$ and $y = -3x - 15$.

Substitute the equal parts of the equations.

$$5x + 1 = -3x - 15$$

Solve for x .

$$8x = -16$$

$$x = -2$$

Replace x with -2 in either original equation and solve for y .

$$y = 5(-2) + 1$$

$$y = -10 + 1$$

$$y = -9$$

$$y = -3(-2) - 15$$

$$y = 6 - 15$$

$$y = -9$$

The two lines intersect at $(-2, -9)$.

Find the point of intersection (x, y) for each system of linear equations.

1. $y = x - 6$

$$y = 12 - x$$

2. $y = 3x - 5$

$$y = x + 3$$

3. $y = 2x + 16$

$$y = 5x + 4$$

4. $y = 3x - 5$

$$y = 2x + 14$$

5. $y = x + 7$

$$y = 4x - 5$$

6. $y = 7 - 3x$

$$y = 2x - 8$$

Example 2

The Mathematical Amusement Park is different from other amusement parks. Visitors encounter their first decision involving math when they pay their entrance fee. They have a choice between two plans. With Plan 1 they pay \$5 to enter the park and \$3 for each ride. With Plan 2 they pay \$12 to enter the park and \$2 for each ride. For what number of rides will the plans cost the same amount?

The first step in the solution is to write an equation that describes the total cost of each plan. In this example, let x equal the number of rides and y be the total cost. Then the equation to represent Plan 1 for x rides is $y = 5 + 3x$. Similarly, the equation representing Plan 2 for x rides is $y = 12 + 2x$.

We know that if the two plans cost the same, then the y value of $y = 5 + 3x$ and $y = 12 + 2x$ must be the same. The next step is to write one equation using x , then solve for x .

$$5 + 3x = 12 + 2x$$

$$5 + x = 12$$

$$x = 7$$

Use the value of x to find y . $y = 5 + 3(7) = 26$

The solution is (7, 26). This means that if you go on 7 rides, both plans will have the same cost of \$26.

Write a system of linear equations for each problem and use them to find a solution.

7. Jacques will wash the windows of a house for \$15.00 plus \$1.00 per window. Ray will wash them for \$5.00 plus \$2.00 per window. Let x be the number of windows and y be the total charge for washing them. Write an equation that represents how much each person charges to wash windows. Solve the system of equations and explain what the solution means and when it would be most economical to use each window washer.
8. Elle has moved to Hawksbluff for one year and wants to join a health club. She has narrowed her choices to two places: Thigh Hopes and ABSolutely fABulus. Thigh Hopes charges a fee of \$95 to join and an additional \$15 per month. ABSolutely fABulus charges a fee of \$125 to join and a monthly fee of \$12. Write two equations that represent each club's charges. What do your variables represent? Solve the system of equations and tell when the costs will be the same. Elle will only live there for one year, so which club will be less expensive?
9. Misha and Nora want to buy season passes for a ski lift but neither of them has the \$225 needed to purchase a pass. Nora decides to get a job that pays \$6.25 per hour. She has nothing saved right now but she can work four hours each week. Misha already has \$80 and plans to save \$15 of her weekly allowance. Who will be able to purchase a pass first?
10. Ginny is raising pumpkins to enter a contest to see who can grow the heaviest pumpkin. Her best pumpkin weighs 22 pounds and is growing at the rate of 2.5 pounds per week. Martha planted her pumpkins late. Her best pumpkin weighs 10 pounds but she expects it to grow 4 pounds per week. Assuming that their pumpkins grow at these rates, in how many weeks will their pumpkins weigh the same? How much will they weigh? If the contest ends in seven weeks, who will have the heavier pumpkin at that time?
11. Larry and his sister, Betty, are saving money to buy their own laptop computers. Larry has \$215 and can save \$35 each week. Betty has \$380 and can save \$20 each week. When will Larry and Betty have the same amount of money?